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SCIENTIFIC RESEARCH, FOREST ASSESSMENT AND DEVELOPMENT OF CRITERIA AND INDICATORS FOR SUSTAINABLE FOREST MANAGEMENT

Programme element III.1 (a): Assessment of the multiple benefits of all types of forests

Report of the Secretary-General

SUMMARY

The present report relates to category III, Scientific research, forest assessment and development of criteria and indicators for sustainable forest management, of the work programme of the Ad Hoc Intergovernmental Panel on Forests (IPF). It addresses programme element III.1 (a), on assessment of the multiple benefits of all types of forests.

The considerations of the Commission on Sustainable Development at its third session and, more recently, of the Ad Hoc Intergovernmental Panel on Forests at its second session have served as background to a number of recent meetings and consultations whose objectives have been to shape the next regional and global forest resources assessments. These meetings have drawn conclusions and identified opportunities and constraints that are summarized below.

With regard to uses and users, increased attention should be given to serving those users who are intermediates between the primary data and the policy- and strategy-making level. These users would typically undertake targeted studies such as forest sector outlook studies or carbon budget studies and present processed information to be used in international debate. They would need a base of well-documented and highly accessible source data with good references to other sources.

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Progress in making primary data widely accessible will also address, in part, the topic of "more intensive use of existing information" (by external users). Moreover, for the global assessment itself, one of the most promising ways of generating new information lies in combining data from various sources using geographical information systems (GIS). This tool has been applied for the part of the global assessment covering the developing world, but its potential is far from being fully utilized. For the global forest resources assessment (FRA) process, it is recommended that its use be extended also to the part of the assessment covering the industrialized world.

Country capacity-building: At national and subnational levels, capacity-building has a key role in forest resources assessment for a number of reasons: (a) forest management action is effected at these levels, (b) many countries do not have the institutional capacity to design and implement strategies for the management of their forest resources, and (c) the Food and Agriculture Organization of the United Nations (FAO) and other international organizations concerned depend for their data collection on information that countries have already collected for their own purposes. Also, to be successful, data collection for global assessment has to bring advantages to the countries and institutions involved in this undertaking. Such advantages can consist of assistance in organizing existing information for national planning and decision-making, various forms of capacity-building, access to information networks, and facilitating reporting obligations on such international programmes and agreements as Agenda 21, the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity and the various processes regarding criteria and indicators for sustainable forest management.

Global framework for the forest resources assessment 2000: The FAO expert consultation on the global Forest Resources Assessment 2000 (FRA 2000), held in Kotka, Finland, proposed that the data content of FRA 2000 be considerably widened, compared with that of FRA 90. New information to be included covers the availability of forests for wood supply, ownership, "naturalness" and protection status of forests, fellings and removals, data on forest fires and the character and importance of non-wood goods and services. It also recommended that the remote-sensing approach and the presentation of key information within ecofloristic zones as applied in FRA 90 for the tropical countries be extended to all regions of the world.

Involvement of countries and partners: The plans for FRA 2000 and beyond imply a move away from a centralized approach to considerably greater involvement of countries and other players. Much labour-intensive support will be required to initiate and sustain country involvement.

Implications of a broader data content: The proposals for the data content of FRA 2000, particularly new types of data, have to be systematically confronted with the existing limitations in available information, tools and resources. In particular, the following will have major resource implications:

(a) Dialogue and communication with all countries and their institutions must be intensified;

(b) The application of sampling high-resolution satellite data and the organization of existing information using GIS should be extended to all regions of the world. This will involve setting up and coordinating partnership arrangements and contracts, as well as increasing the capacity within FAO;

(c) An ecofloristic zone map and a vegetation map covering the world are needed tools for data capture and analysis. Source data can be made available through partnership arrangements, and a team should be set up to produce the maps;

(d) Common features of the activities mentioned are that they (i) are labour-intensive and (ii) require coordination and administrative support beyond the capacity of the existing secretariats.

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INTRODUCTION

1. The Commission on Sustainable Development at its third session defined the scope of programme element III.1 as follows: to "review existing periodic assessment of forests, including relevant socio-economic and environmental factors, at the global level; identify shortfalls in present assessments relative to policy considerations; and recommend practical ways of improving such assessments. Examine ways to broaden the scientific knowledge and the statistical database available in order to better understand the ecological, economic, cultural and social functions performed by all types of forests. Promote the further development of methodologies for properly valuing the multiple benefits derived from forests in the form of goods and services, and subsequently to consider their inclusion within the systems of national accounting, drawing upon work that has been already undertaken by the United Nations and other relevant organizations". 1/

2. The work under this programme element (III.1) is guided by chapter 11 of Agenda 21 2/ and the Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests, 3/ as well as the decisions taken at the third session of the Commission on Sustainable Development and further elaborated at the first and second sessions of the Ad Hoc Intergovernmental Panel on Forests.

3. The Panel at its first session emphasized the need for the preparation of two reports, one of which is the present report on programme element III.1 (a). It is concerned with identifying ways to expand on the Food and Agriculture Organization of the United Nations (FAO) Forest Resources Assessment with regard to the qualitative and quantitative assessment of all types of forests, including information on biological resources and non-wood forest products and services; information on environmental and social benefits; standardization of tropical and non-tropical data; collection of broader types of forest statistics; coordination of forest monitoring with remote sensing and geographical information systems; and the continuous nature of the assessment and the accessibility of information generated to all interested parties.

4. The report takes into consideration paragraphs 11 and 15 of the Statement on Biodiversity and Forests from the Convention on Biological Diversity to the Ad Hoc Intergovernmental Panel on Forests of the Commission on Sustainable Development (E/CN.17/IPF/1996/9, annex).

5. At the second session of the Panel, programme element III.1 was a topic for "substantive discussion". At the third session of the Panel, it is scheduled for "further substantive discussion".

6. The present report has been prepared by FAO as the lead agency for programme element III.1 (a), in consultation with the secretariat of the Ad Hoc Intergovernmental Panel on Forests in the Division for Sustainable Development of the Department for Policy Coordination and Sustainable Development of the United Nations Secretariat. In addition comments and contributions were received from the Centre for International Forestry Research (CIFOR), the World

Bank, the United Nations Environment Programme (UNEP), the Economic Commission for Europe (ECE) and the United States Forest Service.

7. The report of the Secretary-General to the second session of the Ad Hoc Intergovernmental Panel on Forests on programme element III.1 (a) (E/CN.17/IPF/1996/6) was concerned with ways to expand the periodic FAO forest resources assessments in general. This report will develop the issue further, but also focuses more concretely on relevant recent events and on the Forest Resources Assessment 2000 (FRA 2000), which is now in an advanced planning stage. A FAO expert consultation on FRA 2000 (Kotka III) was held in Kotka, Finland, in June 1996 in cooperation with ECE and UNEP, with the support of the Government of Finland and with participants from developed and developing countries from all regions of the world.

I. OUTCOME OF THE DISCUSSION DURING THE SECOND SESSION OF THE AD HOC INTERGOVERNMENTAL PANEL ON FORESTS

8. The discussions during the second session of the Panel, as reflected in the Co-Chairmen's transitional summary, highlighted a number of issues of direct significance to the planning of the forest resources assessment 2000 (FRA 2000) and to follow-up in the third session of the Panel. The issues are briefly recalled here, while the next section will explain their current status. It was noted that there were many shortfalls and gaps in existing information. To improve the situation, it was recommended that:

(a) Existing information should be used more intensively;

(b) National forest assessment programmes should be transparent and accessible to all interested parties;

(c) A study of uses and categories of users of forest resources and related information at the international level should be required;

(d) Research on forest inventory and monitoring techniques should be strengthened;

(e) Efforts should be made to harmonize approaches to data collection and analysis in order to enhance comparability among countries;

(f) The current 10-year interval between global forest resources assessments should be shortened;

(g) Capacity-building in data gathering which was called for, should be integrated with strategic planning and decision-making. This statement is in line with Agenda 21, chapter 11, programme area D, which puts forest assessment in the context of strategic planning when it notes that "assessment and systematic observations are essential components of long-term planning, for evaluating effects, quantitatively and qualitatively, and for rectifying inadequacies";

(h) Coordination of efforts at the international level should be enhanced;

(i) Mobilization of necessary funding should be given due consideration in view of the inadequate financial resources currently available for national level forest assessments. As will be shown, this is also true for the staff and financial resources available to the secretariats that have the mandate to carry out regional and global assessments and to organize capacity-building efforts;

(j) In the data dissemination work, special attention should be given to those countries and interested parties that had difficulties in accessing internationally available information.

II. CURRENT STATUS OF ISSUES RAISED DURING THE SECOND SESSION OF THE PANEL

A. Current status of points highlighted by the Panel at its second session

9. Hereunder some of the points highlighted by the Panel at its second session and mentioned in section I are commented on as follows:

10. More intensive use of existing information. Status: the expert consultation on FRA 2000, held in Kotka, Finland, in June 1996 (Kotka III) recommended that, for FRA 2000, organization and integration of existing information by means of geographical information systems (GIS) should be extended to the industrialized countries.

11. Study of users and uses. Status: at national level users and uses are relatively easy to identify. A cornerstone of capacity-building - that should remain so - is the planning and execution of forest inventories in dialogue with users and the establishment of an information service function to (a) serve users with tailor-made information and (b) make the data collectors aware of user needs.

At international level users and uses are far more difficult to identify. Little progress has been made so far with user needs studies. It can be noted that FRAs have been tailored to serve the policy- and decision-making level directly. It is suggested that more weight be given to the need for scientific knowledge and a base of well-documented and accessible source data with good references to other sources. This would lead back to the original task definition of the Commission on Sustainable Development at its third session, part of which is "examine ways to broaden the scientific knowledge and the statistical database available in order to better understand the ecological, economic, cultural and social functions performed by all types of forests". 4/ It also opens a wide field suitable for partnership arrangements with actors who will interpret data and put them in specific contexts.

12. Enhance comparability among countries. Status: common definitions and classifications of core data for global application in FRA 2000 have been agreed upon. After necessary refinement and approval in the governing bodies of ECE/FAO and FAO, they should be widely publicized. Countries should be prepared to adapt their own inventories, under the condition that

they remain unchanged for a long time, so that information can be provided in a format that fits the common standards. As an immediate step, efforts have been recommended by Kotka III to improve the adaptation of country data to common standards. Such an adaptation has been quite incomplete in FRA 90. It is a technically complex task that requires special efforts, particularly on the part of the reporting countries and intensified interaction between secretariat and countries.

13. Coordination of efforts at international level. Status: a situation with generally scarce resources has created a climate that is favourable to coordination. The attention given to forest resources assessments has helped raising interest in contributing to this effort. Recent signs of this are (a) the fact that a "Workshop on Remote Sensing Support for the Global Forest Resources Assessment 2000" became a reality in March 1996, that many of the important members of the remote-sensing community participated and that a general interest was expressed in contributing, (b) ongoing cooperation with the TREES (Tropical Ecosystem Environment Observations by Satellites) project of the Commission of the European Communities (CEC), taking advantage of two parallel studies using satellite data of different resolution, (c) ongoing cooperation with CEC regarding a comparative study of European forest inventories, and (d) active participation of the International Union of Forest Research Organizations (IUFRO), the World Conservation Monitoring Centre (WCMC) and the World Wide Fund for Nature (WWF) in Kotka III.

Moreover, guidelines for forest inventory have recently been published by IUFRO. IUFRO is also, on behalf of FAO, undertaking a comparative study of forest inventory terms. There are numerous other examples where scientific expertise has contributed to the development of FRA and to the use/interpretation of results, with partial support from its own organizations and at marginal costs for FAO and ECE/FAO.

The challenge for FAO, in collaboration with its partners, is to prepare a plan in which the tasks to be completed and needs for cooperation are specified. Such a plan will be prepared in the second half of 1996 and it will take note of the proposals made by Kotka III. Limitations to cooperation: specifications and the integration of inputs from other actors are technically demanding tasks and require a strong coordinating nucleus. This nucleus is insufficient in both secretariats involved (ECE/FAO, Geneva, and FAO, Rome).

B. National level

14. At national, subnational and local levels capacity-building is a key objective for several reasons: (a) forest management action is effected at these levels, (b) many countries do not have the institutional capacity to design and to implement strategies for the management of their forest resources, and (c) FAO and other international organizations concerned depend for their data collection on information that countries have already collected for their own purposes.

15. National and subnational forest inventories serve planning and monitoring purposes at their respective levels. They are justifiable only if the corresponding planning mechanisms are in place. Moreover, such inventories are costly and have to defend their place in tough prioritization processes. Therefore, funding is often a limiting factor for forest inventories being carried out.

16. The conclusion is that the importance of capacity-building in forest management planning on all levels, from national strategic to local operational, can hardly be overestimated. This has been recognized by the Panel at its second session, as can be seen under section I above.

Current status

17. Country capacity-building has been an important topic in an auto-review undertaken in 1994, in which FAO's achievements in forest resources assessment were reviewed and a strategy for future development was presented. In this review, a basis for action and for funding was developed. It was noted that capacity-building is demanding in terms of staff resources and long-term commitment and requires conceptual and administrative coordination. It is a complex task concerning which new experience needs to be built up. Innovative approaches and a learning process are required. Based on the existing experience two lead ideas were formulated:

(a) Country commitment is a necessary condition for success;

(b) Forest assessment must be better integrated into a planning context (national, provincial or local);

and the following elements of a strategy were identified, namely, to:

(a) Use selected field projects as vehicles for country capacity-building because it is cost-efficient and there is a chance of obtaining country commitment;

(b) Establish, at FAO headquarters, an institutional memory on a country-by-country basis with follow-up of projects/programmes;

(c) Promote regional and global networks to provide cost-effective mechanisms for cooperation among developing countries and between industrialized and developing countries. Workshops, studies of a regional nature and seminars can be used for both promotion and cooperation purposes;

(d) To the extent suitable, introduce the above lead ideas consistently in training activities;

(e) Seek sustainable benefits through cooperation with national forest action programmes, where such programmes are long-term and have focus, and with the National Forestry Action Plan Support Unit at FAO headquarters.

18. Country capacity-building is considered a priority area by the donor community, and there has already been a certain response from donors. In

chronological order, France, Sweden, India (for in-country efforts) and Japan have provided funding for capacity-building in the amount of US$ 3.2 million. Moreover, many donor countries have substantial capacity-building components in their bilateral and other international development programmes. Sweden will be providing a series of training courses beginning in the third quarter of 1996 on "Development of national forest policies and strategies, including acquisition and organization of forest resources information and implementation of national forest policies and programmes".

C. Regional and international levels

19. A global framework for FRA 2000 and core definitions and classifications were agreed upon at Kotka III. A basis of tested methods and data acquisition mechanisms is in place. The tools available are assessment based on analysis of existing reliable country information (already applied for the developing countries), sampling of high resolution satellite data (already applied for tropical countries), organization of existing reliable information using GIS (already applied for developing countries), questionnaires supported by a network of country correspondents (applied in industrialized countries), and special studies undertaken by consultants or cooperating partners. The strength of this array of tools is that it provides a basis of tested data acquisition approaches that, if used more intensively and on a worldwide basis, can meet the new data requirements contained in the agreed global framework. However, to activate the full strength of this tool set would require a totally different type of secretariat for the industrialized countries with new types of partnership arrangements. For the developing countries, direct contacts with countries will be needed on a much wider scale than hitherto, so as to assemble within the country and extract for the global FRA new information in a process in which various sources including expert opinions are utilized.

20. Ongoing cooperation between FRA and the TREES project as mentioned above aims at making the remote-sensing tools of both programmes more cost-effective. Cooperation on the Global Land Cover Characteristics Database (GLCCD) is envisaged (see sect. III) and is considered a condition for the production of georeferenced data and therefore for the use of GIS in new regions. Moreover, the use of maps based on GLCCD will considerably improve analytical power in various steps of the data processing and the cost efficiency of the remote-sensing component.

III. ASSESSMENT OF RECENT DEVELOPMENTS AND OUTLOOK FOR THE FUTURE

21. Important to mention are a number of expert meetings that are milestones on the way to forming the global forest resources assessment 2000 (FRA 2000). These events culminated with the expert consultation on global Forest Resources Assessment 2000 which was held 10-14 June 1996 in Kotka, Finland. This consultation brought about an agreement on a global framework specifying the content, data format, core definitions and classifications for FRA 2000.

A. Workshop on remote-sensing support for the global Forest Resources Assessment 2000

22. The above workshop was organized by IUFRO in cooperation with FAO, ECE/FAO, UNEP and the Joint Research Centre of the Commission of the European Communities, 12-14 March 1996, in Washington, D.C., United States of America. It was hosted by the Forest Service of the United States Department of Agriculture.

23. Significant elements of the outcome:

(a) The positive interest of the remote-sensing community in contributing to FRA 2000 was noted. FAO and ECE/FAO must specify a programme and their needs for assistance. A transparent programme including contingency plans for alternative funding levels needed to attract donors;

(b) As a concrete subject for cooperation, the Global Land Cover Characteristics Database (GLCCD), which is under preparation and expected to be completed by the end of 1997, was identified. This database can be used for producing a global ecofloristic zone map and a global vegetation map. Both are essential tools for FRA 2000 and in particular for progress on broadening scope. A major interpretation and validation effort will be needed to produce these maps. Concerns were expressed about feasibility within the tight deadlines;

(c) Acquisition and screening of high resolution satellite data is another area for cooperation - one that is highly complex and in which the remote-sensing community can assist;

(d) In view of the small secretariat resources available, it was considered important that FRA 2000 focus on core information of high quality and not spread its efforts over too many new items.

B. Intergovernmental Panel on Climate Change (IPCC)

24. The Intergovernmental Panel on Climate Change (IPCC) held a workshop on "Emissions by sources and removal by sinks of greenhouse gases from land use changes and forestry" in Sao José dos Campos, Brazil, 21-22 March 1996. It discussed in detail guidelines and data forms for country reporting as a part of obligations to the United Nations Framework Convention on Climate Change. 5/

25. The workshop noted, inter alia:

(a) That most developing countries would face serious problems in providing the required information with a sufficient degree of accuracy;

(b) That there was a considerable knowledge gap on land-use change processes, in particular on the response of tropical forests to human interventions such as shifting cultivation, logging, fire and various silvicultural measures.

26. In view of these facts, it was considered imperative that IPCC and FAO should cooperate (a) to improve the guidelines and data forms in close cooperation with selected national authorities, (b) to identify knowledge gaps, (c) to recommend robust procedures for filling the immediate knowledge gaps, and (d) to recommend longer-term measures to improve data quality and completeness.

27. The workshop identified some important indicators to be included in FRA 2000, as well as the source of information, shortcomings and acquisition methods. It recognized that most of the information is not available for inclusion in FRA 2000 (below-ground living material, biomass in soils, end use of forest products), but made strong recommendations to ensure its inclusion in future assessments.

C. Meeting of the ECE/FAO Team of Specialists on Forest Resources Assessment for the Boreal and Temperate Zones

28. A meeting with the Team of Specialists was held 15-17 April 1996 in Geneva, Switzerland. The meeting considered the outcome of the remote-sensing meeting in Washington, D.C., and prepared, in part, the forthcoming expert consultation in Kotka, Finland. In particular, it contributed to a draft global framework for FRA 2000 that was under preparation and covered data content, definitions and classifications. With regard to the proposals for FRA 2000 that were being formulated, the meeting noted in particular the following:

(a) Reporting intervals shorter than 10 years: difficult to justify vis-à-vis countries, since practically no country had inventory intervals shorter than 10 years. In the intervening period, updating at the international level could be made on the basis of (i) those national/subnational inventories that had produced reports since the latest occasion and (ii) international remote-sensing activities (that so far were in place only for tropical countries). Updating using the first method mentioned was taking place currently for the report to the FAO Committee on Forests on the state of the world's forests;

(b) There was a need to confront the demand for new information with technical and resource limitations. Cost-benefit analyses were required;

(c) Showing data by ecofloristic zone in industrialized countries required (i) an ecofloristic zone map that needed to be agreed upon and prepared, (ii) data by province, and (iii) GIS facilities, all having major resource implications;

(d) The Helsinki criteria of sustainable forest management were helpful in summarizing main issues to be addressed at the international level, but there were considerable difficulties in regard to collecting data on many of the specified indicators. Data collection should be designed to contribute to the overall issues;

(e) There were good opportunities to tap the wealth of information available in countries, but there was a major constraint at the level of the ECE/FAO secretariat's capacity to coordinate and administer data collection and

to analyse, validate and integrate the data received. There was therefore a danger that only a fraction of the great potential of the FRA 2000 would be realized because of a lack of the relatively small amount of secretariat resources that could also ensure that the much larger resources being contributed in kind by countries were used to the full.

D. Expert consultation on global Forest Resources Assessment 2000 (Kotka III)

29. The above consultation, held 10-14 June 1996 in Kotka, Finland, was organized by FAO in cooperation with ECE/FAO and UNEP and sponsored by the Government of Finland. Forty experts from 29 countries in all parts of the world and from four non-governmental and intergovernmental organizations participated, together with secretariat staff from FAO, ECE/FAO, UNEP and the Ad Hoc Intergovernmental Panel on Forests. The objective of the consultation was to agree on a global framework specifying content, the data acquisition process, data format, core definitions and classifications. Most of the objectives were achieved, but due to time limitations the topic of the data acquisition process was covered only superficially. Consequently, the proposals for data content, in particular new types of data, have yet to be systematically confronted with the existing limitations in available information, tools and resources. Some of the proposals may later be found difficult to achieve.

30. Significant elements of the outcome:

(a) A global framework for FRA 2000 was agreed upon. This implies several novel steps at the global level:

(i) A breakdown of forest into the categories "available" and "not available" for wood supply;

(ii) The above categories to be shown within three ownership classes;

(iii) Key information to be shown within ecofloristic zones worldwide;

(iv) A breakdown of forest by "naturalness";

(v) A breakdown of forest by protection status (legally protected/ not protected);

(vi) Changes over time for naturalness, availability for wood supply and protection status;

(vii) A change matrix showing the flow of area among the categories forest, other wooded land and other land;

(viii) Growing stock and biomass to be broken down by three species groups (coniferous, broadleaved, others);

(ix) Fellings and removals to be shown in total and for forest available for wood supply;

(x) Number of forest fires and area burnt;

(xi) Information on the character and importance of non-wood goods and services;

(b) As on previous occasions, there will be regional assessments for the industrialized and for the developing countries that will, for the respective region, expand the data content so that the content covers region-specific information needs;

(c) Definitions and classifications for the parameters to be included were agreed upon. Of particular interest is the fact that a common definition for core terms such as forest was accepted. Details will still have to be worked out by the secretariats;

(d) Among the criteria for the selection of parameters to be included in the framework, there should be one determining that the information requested is useful at the global level, and measurable, and can be assessed with the available tools at acceptable cost;

(e) Concern was expressed that, despite far-reaching demands for information, there were few signs that FRA information presented had received attention or exerted influence at the decision-making level. The secretariats were urged to raise the political and media profile of the FRA process;

(f) FRA 90 had weaknesses owing to lack of comparability between countries and regions and varying quality of data received by means of questionnaires (industrialized countries). In particular, there were many gaps and inconsistencies. Means to overcome these weaknesses were discussed by the meeting and the following recommendations made:

(i) The approach used so far in the tropics of reporting core data by ecofloristic zone and using ecofloristic zones in the analysis, having been found very meaningful, should be expanded to all regions of the world;

(ii) There should be an evaluation of whether the sampling of high resolution satellite data which had been applied in the tropical countries in FRA 90 could be extended to cover all regions. This would allow consistent and detailed change monitoring and validation of the results received by other means, as already demonstrated for the tropical region;

(iii) As organizing existing information with the help of GIS was a powerful tool applied in the assessment for developing countries, its use should be extended to the industrialized countries;

(iv) For developing countries, the network of regional and national correspondents used in FRA 90 should be re-established to collect data that were available in countries and to associate those countries in the assessment process. That network needed to be much intensified so

as to collect a range of new data that could not be retrieved with the mechanisms used so far;

(v) Comparability would be improved with the introduction of common definitions in the FRA for all regions of the world. However, strong limitations to such improvement were recognized. Above all, vegetation and climate were fundamentally different in different parts of the world, implying that forests would never be fully comparable between regions. Second, a condition for improved comparability was that country data could be adapted to the common definition. Such adaptation was a technically complex task and required resources. In the past, it had been quite incomplete. Significant progress was possible, but required much intensified interaction between secretariat and countries;

(vi) Gaps and inconsistencies were problems linked with the questionnaire approach (used in industrialized countries). It was understood that most data requested were available in countries, although in some cases only as expert estimates. Much intensified interaction between secretariat and country correspondents must be established to ensure retrieval of more complete and consistent data. However, two kinds of obstacles had been identified: (a) full and correct reporting was a costly exercise for countries and (b) some of the data required could not be found in official national statistics. Unofficial sources and expert opinions were required. This would meet with difficulties in some countries that had a very rigid data dissemination policy.

E. Criteria and indicators for sustainable forest management

31. In preparation for Kotka III, an attempt was made to match the information that had been collected at global level by FRA 90 and proposed for collection by FRA 2000 against the indicators of sustainable forest management identified by the ongoing international processes concerned with this subject. Results are shown in the table below, whose arrangement required some arbitrary judgement. Indicators such as "area and change of ..." are given a half-score if area only is being assessed.

32. The table shows, for example, that for the Helsinki process, information on 5 of 27 indicators are proposed for collection in FRA 2000, compared with only 1.5 in FRA 90. Additional coverage exists through other sources such as economic statistics. Some indicators that will not be assessed globally are assessed in the region to which a given process refers, as is the case, for example, with defoliation (Helsinki process) in Europe. It should be kept in mind that most of the indicators have their significance at the management unit or national and subnational levels. Considerably more information is usually available at these levels.

FRA 1990 and FRA 2000 coverage of indicators identified by international processes

Process	Total number of national-level indicators identified	Number of indicators covered by	
		FRA 1990	FRA 2000
Helsinki	27	1.5	5
Montreal	67	1	5
Dry Africa	47	2.5	4.5
Tarapoto	47	2	2.5

33. An inquiry circulated by the Helsinki process to 39 countries in 1994 was returned by 31 countries. Serious difficulties at the national level were encountered with 6 of the 27 indicators. Twenty-seven countries (of 39) provided forest area change data. In its own way, this highlights the difficulties for FRA in providing even core information with no gaps.

F. More country involvement in data acquisition

34. The basic mechanisms for data acquisition that are available have been presented in section II.C. One mechanism not mentioned therein is the data validation round, in which source data available in the ECE/FAO and FAO secretariats as well as the derived standardized data for common reference years are distributed to countries for validation. This mechanism is intended to be used in a modified way that suggests, in part, one element of a new strategy by which the role of countries in the future FRA processes can be strengthened and made more active. The following steps are involved, namely, to:

(a) Store all relevant data that are internationally available in a statistical/geographical database linked to spatial entities such as countries, districts, forest stands, national parks, ecofloristic zones, and so on;

(b) Disseminate to each country, after proper presentation and promotion, the statistical/geographical information pertinent to that country, accompanied by a questionnaire;

(c) Explain in the dispatch the FRA 2000 approach and the utilization of information to be provided by the country;

(d) Illustrate the current status of information from the individual country;

(e) Link to each thematic map a questionnaire requesting updating;

(f) Highlight the fact that FRA 2000 results will consist of similar data sets for each country after updating by the country and FAO with partners;

(g) Follow up with subregional and regional efforts (dialogue, communication, workshops, visits) to the greatest possible extent.

IV. ASSESSMENT OF OBSTACLES TO BE OVERCOME, CHALLENGES FORESEEN

A. Functions of forests

35. The task statement made by the Commission on Sustainable Development at its third session for programme element III.1 of the Panel's programme of work called for an examination of "ways to broaden the scientific knowledge and the statistical database available in order to better understand the ecological, economic, cultural and social functions performed by all types of forests". 4/

36. It can be noted in retrospect that FAO's FRA has been focused so far on ecological aspects, while few parameters cover the economic, cultural and social functions of forests. In FAO's Global Fibre Supply Study and Sector Outlook Study for Asia-Pacific, both of which are in progress, it has been found that the information provided by FRA is insufficient for these purposes. Cultural and social functions of forests are only marginally covered. However, the change matrices of FRA 90 for tropical countries, which show the destination of land cover changes, allow conclusions on the influence of cultural and social factors on deforestation and forest degradation.

37. Kotka III in its proposed global framework attempted to cover more fully the breadth of information required for the international debate on forestry. This resulted in a number of new parameters being proposed for inclusion in the global framework. These parameters have a bearing in particular on the economic function (for example, ownership, available/not available for wood supply). However, it was also found that many parameters discussed were not relevant at the global level, not consistently quantifiable or not assessable with available tools.

38. The situation is different at the regional and in particular the national level, where a number of significant studies can be mentioned, as follows:

(a) Two recent assessments for industrialized countries have included specified functions such as recreation, conservation, protection, hunting and grazing, and for each have shown the total forest area broken down into importance classes - high, medium and low. It has also given a verbal account of "hot" political issues. The challenge is to produce a meaningful summary of such rather heterogeneous information. Theoretically, the character of this type of information is right, but there have been doubts about its practical usefulness;

(b) Work is under way on economic, cultural and social functions of forests through the FAO-supported International Forestry Resources and Institutions (IFRI) research programme. IFRI is a global network of collaborating research centres, in Bolivia, Ecuador, Guatemala, India, Mali,

Nepal and Uganda, that focuses on the interactions between local communities and the forest resources they use. Through the application of a relational and multidisciplinary database, a selection of economic, cultural and social variables is linked to the biophysical condition of forest resources in selected sites at the local level where periodic assessments are conducted to also observe the dynamics of change. The prospect of combining this type of micro-level study with national and regional studies is currently being explored by FAO;

(c) At the national level, one can find a few yearbooks of forest statistics that give a wealth of information regarding economic, cultural and social functions. Examples are accounts of objectives and tools in forest policy, institutions and their role, research and education, legal regulations, the structure of wood transport, production, consumption and stocks of forest products, costs, prices, investments, profitability, trade, employment, quantities of non-wood products, recreation and hunting. It may be worth discussing whether the few cases where such rich information is made available can be used at the supranational level. There may, however, be no point in international aggregation, since it is hardly conceivable that such broad information can ever be sufficiently standardized for international comparison. However, there exists the challenge of demonstrating to wider groups of countries the possibilities for collecting and making available at the national level broad information related to the various functions of forests. In this context, it may be meaningful to use the examples as case-studies.

B. Data acquisition mechanisms

1. General

39. Kotka III proposed, for the global framework of FRA 2000, a considerable increase of data content, compared with that of FRA 90. Comparability of information between countries and regions should be improved and gaps and inconsistencies in the information be removed/reduced. To make such broadening and improvements possible, it recommended that mechanisms for data acquisition and analysis that had been previously used in some part of the world should be used worldwide. To follow these recommendations implies a major challenge for the two secretariats involved in FRA, as will be outlined below.

40. Some specific obstacles to data acquisition for global studies were noted, and are given below:

(a) The plans for FRA 2000 and beyond imply a move away from a centralized approach to considerably greater involvement of countries. This process will not come of itself. Countries are sovereign and have priorities other than reporting information to international forest assessment activities. A condition for successful international data exchange is that the information be useful for the network of participating countries. Even forest inventory for merely national or subnational purposes often has low priority. For these reasons much labour-intensive support is required to initiate and sustain country involvement. Capacity-building will be part of the effort, but will produce results only in the long run;

(b) Time and equipment for collection and exchange of data must be available, as well as funding of travel to, for example, subregional workshops and exchange of experience. The mere lack of a computer with e-mail connection can be the limiting factor.

2. ECE/FAO secretariat in Geneva

41. This secretariat has the mandate to carry out periodic forest resources assessments for the industrialized countries. The linkage with ECE renders possible the involvement in the FRA process of Belarus, the Russian Federation and Ukraine, which are States Members of the United Nations, but not of FAO. To fulfil its mandate, ECE/FAO uses a questionnaire and a network of country correspondents. The European Forest Institute has helped by incorporating data into a database. Neither remote-sensing nor GIS facilities and experience are available at the secretariat. The professional staff resources available for FRA correspond to half-time of one person. The traditional approach to funding ECE/FAO work on temperate and boreal forest resource assessment has been a cooperative approach in which member countries and certain organizations have provided major contributions, mostly in kind, and a very small secretariat team has played a coordinating and assembling role with a limited amount of analytical and validation work; this is a natural and justified approach in a region where most counties have rather well-developed forest inventory capacity. However, in view of the new challenges it is not sufficient anymore. The global framework for FRA 2000 which was agreed upon at Kotka III, as well as the regional framework for the industrialized countries, requires new data acquisition tools, a much intensified interaction between secretariat and national correspondents, and the development of new partnership arrangements.

42. The proposals for FRA 2000 imply that multisource data analysis with the help of GIS is a necessity. Sampling of high resolution satellite data, according to Kotka III, "should be evaluated". If introduced, a fully staffed remote-sensing and GIS laboratory is required. A facilitating factor is that techniques and equipment that have been tested and have proved useful for the developing countries, are available in the Rome secretariat.

43. The proposals necessitate a considerably enhanced interaction between secretariat and country correspondents in order to avoid gaps and inconsistencies. A new activity requiring particularly intensive cooperation will be adjustment of country data to common standards. It has been noted that, in FRA 90, such adjustment has been made by a few countries only.

44. At the level of the ECE/FAO secretariat, the following obstacles have to be considered:

(a) Preparation of an ecofloristic zone map and a vegetation map for the industrialized countries. It is envisaged that the maps can be derived from the Global Land Cover Characteristics Database (GLCCD) which is expected to be completed by the Earth Resources Observation System (EROS) Data Center by the end of 1997;

(b) Georeferencing: multisource data analysis with the help of GIS requires that the statistical data on forests provided by countries become georeferenced. Such georeferencing is possible, based on the above-mentioned or other existing vegetation maps, but the work requires staff resources;

(c) Funding of all activities including coordination and administration of the network of country correspondents and of partnership arrangements;

(d) National sensitivity towards providing data, in particular unofficial data and expert estimates;

(e) National sensitivity towards the adjustment of country data to common standards;

(f) Funding: two experienced full-time persons and one assistant with computer skills may be required as a coordinating nucleus. This assumes that remote-sensing and GIS activities are funded separately;

(g) Training of staff for communication with country correspondents and offices and with cooperating partners.

3. FAO secretariat in Rome

45. This secretariat is charged with periodic forest resources assessments for the developing countries and with a global synthesis. It has developed and implemented a two-pronged approach for FRA 90. One approach was based on the analysis of existing reliable country reports and the other on sampling of high resolution satellite data. A network of cooperating institutions and individuals has been used extensively and has played a decisive role in all phases of the assessment. Where it has been possible to combine global assessment with country capacity-building, this has been beneficial to both activities.

46. Secretariat activities are funded from two sources, the Regular Programme of FAO and external funds in the form of a multi-donor Trust Fund. In recent years, FAO has made efforts to increase the Regular Programme contribution and the number of professional staff, despite severe budget restrictions. Despite these efforts the staffing still falls short of what is needed. Therefore, major parts of the assessment will continue to depend on external funding which is by its nature uncertain, variable in size and short-term.

47. Obstacles to consider:

(a) A number of the new parameters require a new kind of interaction with countries. Examples are information on non-wood goods and services and state and change with regard to the degree of human intervention in forests and to the availability of forests for wood supply. Ways have to be found to demonstrate the usefulness of these data for the countries themselves. A new type of interaction with countries will be needed to retrieve such information, and combination with capacity-building is likely to be valuable in this context;

(b) Preparation of an ecofloristic zone map outside the tropical belt and of a vegetation map for all developing countries is the same obstacle as that identified above for the ECE/FAO secretariat;

(c) It has been shown that interaction with a network of cooperating institutions and individuals has played an important role in FRA 90. With the new information requirements, a considerably greater number of such interactions will be needed.

C. Resource requirements

48. The proposed global framework for FRA 2000 contains many novel features that require, above all, an intensification and extension to new regions of data acquisition tools already tested. It is not possible at this time to "present the bill" for the proposed broadening of FRA. A plan to be developed in the latter part of 1996 will serve as the basis for this. However, some major budget items are evident:

(a) Interaction with countries must be significantly intensified;

(b) Partnership arrangements must be made for the execution of specific tasks;

(c) Secretariats need to follow more intensively related activities in data collection, data analysis, data dissemination and research, and to integrate them into FRA;

(d) Use of remote sensing and GIS should be expanded to new regions.

49. Item (a) calls for particular attention. A communication capacity is required that exceeds by far that of the present ECE/FAO and FAO secretariats. FAO support staff will need to visit the major forested countries for direct interaction with national offices and project staff, and national correspondents will need to travel to workshops and meetings. A particular challenge is the fact that practically all countries must be reached, including those where communication facilities pose serious problems. A communication task of such dimensions cannot possibly be handled centrally. Decentralization to regional offices and to subregional actors is called for.

50. With regard to item (b), it must be understood that partnership arrangements and consultancies require solid preparation and monitoring by a competent secretariat as well as follow-up work to integrate the results.

51. Item (c) requires monitoring of activities and scientific publications, as well as maintaining of contacts beyond what is possible with present staffing.

52. Options should be investigated for the realization of item (d). In any case, it appears inadvisable to build up a new remote-sensing and GIS laboratory at ECE/FAO, Geneva.

53. In conclusion, it already appears necessary, before a detailed plan is in hand, to increase the size of the coordinating FRA nucleus by several full-time professionals and support staff so as to make use of existing opportunities of collaboration with countries and with scientific institutions. Young professional officers should be placed in the regional offices of FAO and equipped with travel funds (as was already practised on a small scale in FRA 90).

54. At the time of writing, the work needed for FRA 2000 is largely unfunded. US$ 3.2 million has been pledged by three donor countries for capacity-building and for its coordination. One donor has provided US$ 0.75 million for cooperation on methodology development for the remote-sensing component. Two associate professional officers have been provided for headquarters activities. FAO and the ECE are giving priority to these activities within their regular programmes but, in their present difficult budget situation, together cannot fund more than US$ 0.6 million per year. Major resource mobilization efforts are therefore needed to secure funding for most of the activities of the global forest resources assessment programme.

V. CONCLUSIONS AND PROPOSALS FOR ACTION

55. Since the time of the first United Nations Conference on the Human Environment in Stockholm in 1972, demands on national, regional and global forest resources assessments have increased continuously. Their scope has grown to cover the environmental functions of forests with implications for inventory techniques and cross-sectoral approaches. Economic, social and cultural factors are closely linked to this. In the context of sustainable development and global change studies, systematic observations over time have gained importance, leading to a new focus on change estimation in the assessment activities of many actors, for example, in the global FRA of 1980. In more recent years an increased interest has been noted in true global issues such as the carbon budget and biological diversity, leading to demands for a globally integrated picture of relevant parameters.

56. These developments have had fundamental consequences for the scientific, technical and administrative complexity of forest resources assessments at all levels. A move can be noted from pure tables to organized information systems and within this to geographical information systems with their new potential to integrate information from different sources. Finally, there is an increased interest in process monitoring, for example, in the form of change matrices showing the direction of changes taking place. To cope with these developments, the volume of dialogue and communication is expanding into new dimensions not experienced before. It may also be noted that consistency and continuity of assessment have implications for continuity of institutions at the national and global levels. It is in the context described above that the following proposals for action should be seen.

57. The attention of the Panel is drawn to the need to address the medium- and long-term issues related to the assessment of the multiple benefits of all types of forests, as well as to the need for immediate action required for the implementation of FRA 2000.

58. Resource mobilization. An ever-increasing global interest in forest resources assessment is noted. This has resulted in a considerable broadening of the scope of FRA 2000, with consequent cost implications. It also implies that many potential cooperating partners show an interest in contributing to the assessment process. What can be achieved by the FRA in cooperation with other partners depends to a large extent on the resources that can be mobilized for this purpose.

Proposal for action: The Panel may wish to bring the funding question to the attention of the user community and of countries. This can be initiated before more detailed cost estimates have been made. FAO will, in the latter part of 1996, prepare a plan for FRA 2000 that specifies (a) work to be done, (b) the work process including opportunities for partnership arrangements, and (c) resource needs. It will also develop options for various funding levels and demonstrate what can be achieved at these levels. Moreover, it should consider the question of institutional memory, which is linked with the duration of funding.

59. Capacity-building. The key role of capacity-building is confirmed and so is the need to focus on strengthening the capability at the national level to develop national policies and strategies for the sustainable management of forests and related resources. A network of regional (or subregional) lead centres should be established that will play a key role in country capacity-building.

Proposal for action: Capacity-building in forest inventory should ensure:

(a) Integration of efforts into a well-adapted institutional framework and proper interaction with the user community, in particular at the policy-making level;

(b) A Regular Programme responsibility for guiding and supporting country capacity-building to be established at FAO headquarters;

(c) Additional resources to be obtained for long-term capacity-building activities in countries such as global and regional support networks, workshops and training courses;

(d) That, in a situation with insufficient funding, the provision of core data of high quality is given priority over assessing the largest possible number of requested information elements. In this context, core information is understood to be concerned with the state and change of forest cover worldwide, including destination of change and biomass estimation. Next in priority would be to show information within ecofloristic zones and to distinguish between forests available and those not available for wood production. "High quality" would mean "complete" (no gaps), "comparable" (between countries and regions) and "reliable" (inter alia, verified and adapted to common definitions).

60. Access to information. While there is general acceptance of transparency and accessibility as desirable characteristics of forest inventory, experience has demonstrated is that a number of countries treat the findings of national

forest inventories as confidential information that is to be accessible to government users only.

Proposal for action: Raise awareness about the usefulness of making forest resources information widely available, and encourage, inter alia:

(a) Countries to contribute to periodic forest resources assessments by (i) nominating a focal point for cooperation with the FRA secretariats and (ii) providing, on a continuing basis, the information needed for the regional and global forest resources assessments, irrespective of whether it originates from official or unofficial (expert estimates) sources;

(b) FRA secretariats to derive, from the data received, standardized information in a transparent process and in cooperation with the reporting countries;

(c) FRA secretariats to make source data as well as derived data accessible to countries and the user community at large, thus facilitating the widest possible use of available information.

61. Usefulness of international data collection at the national level. International data collection will be facilitated if the usefulness of the information is appreciated by the reporting countries. That time and equipment for data collection are available must also be ensured.

Proposal for action: Assistance should be provided to national offices in organizing existing information for national planning and decision-making purposes. For example, this may include, as a catalytic factor, installation of computers with an e-mail connection.

62. Uses and users. It appears that assessment data are not frequently used directly in political decision-making. More commonly, this political level is reached in an indirect way. The "intermediates" may be studies targeted towards political issues such as analyses of the consequences of strategies, sector outlook studies and carbon budget studies. Other intermediates are the scientific community, directly or through the media, and non-governmental organizations that use FRA data to make their point.

Proposal for action: While keeping in mind the information needs at the decision-making level, the new line to be followed would give more weight to providing a base of well-documented and accessible source data with good references to other sources. This would include making statistical and georeferenced databases accessible to users, and would also imply increased attention to keeping a reference library of national reports.

63. Regionalization. Intensive dialogue and communication are among the essential tools for FRA, and virtually all countries of the world must become involved. A number of factors make it necessary to decentralize the communication task to regional offices and subregional actors, as indicated below:

(a) The mere volume makes the work unmanageable for one or two central secretariats;

(b) Knowledge of institutions, persons and physical conditions are important for the success of the dialogue;

(c) For national collaborators, travel to a neighbouring country is often simple to arrange, while travel to FAO headquarters or even to a FAO regional office often creates unsurmountable difficulties;

(d) Communication via e-mail and telefax is unavailable or most unreliable in significant parts of the world.

Proposal for action: Ongoing subregional and national activities should be used as a basis for exchange of information and technical experience as well as adaptation of national information formats to common standards. Young professional officers should be placed in FAO regional offices to facilitate the process. There is already some experience of such arrangements.

64. Production of ecofloristic zone and vegetation maps. These map types have been found essential for the process of FRA 2000. The Global Land Cover Characteristics Database (GLCCD) being produced at the EROS Data Center in Sioux Falls, South Dakota, United States, has been identified as a suitable basis from which to develop such maps. Specifications for the vegetation map are in place.

Proposal for action: Ecofloristic zones for new regions need to be specified. A mapping team should be placed at the EROS Data Center to develop the maps for different regions of the world from GLCCD.

65. Data interpretation and dissemination. Three types of action are called for:

(a) Special attention should be given to those countries and interested parties that have difficulties in accessing internationally available information;

(b) Secretariats should "raise the political and media profile" so as to increase the impact of the information collected;

(c) Source as well as processed data should be made accessible to the various potential users in the least aggregated form possible.

Proposal for action: Professional information staff should be involved with the FRA team to deal with ordinary information services and with the three types of action identified.

66. Issues not well covered. The global framework proposed for FRA 2000 implies a broadening into new types of information. Yet much requested information is not included. Examples are the quality of forest management and the social and cultural functions of forests. Reasons for this may be that information that is not available in countries cannot be assessed globally

(unless it can be detected by remote sensing) and that suitable mechanisms and methods are conceivable but have not yet been developed. In spite of these limitations, some progress is possible in certain cases through the use of special studies. Such studies can shed light on a topic although the information produced does not cover all countries and is not necessarily fully compatible with the core data.

Proposal for action: There is a need for identifying suitable topics for special studies and specifying those studies, as well as for advertising such a need.

Notes

1/ See Official Records of the Economic and Social Council, 1995, Supplement No. 12 (E/1995/32), chap. I, sect. D, annex I, sect. III.

2/ Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex III.

3/ Ibid., annex II.

4/ See Official Records of the Economic and Social Council, 1995, Supplement No. 12 (E/1995/32), chap. I, sect. D, annex I, sect. III.

5/ A/AC.237/18 (part II)/Add.1 and Corr.1, annex I.